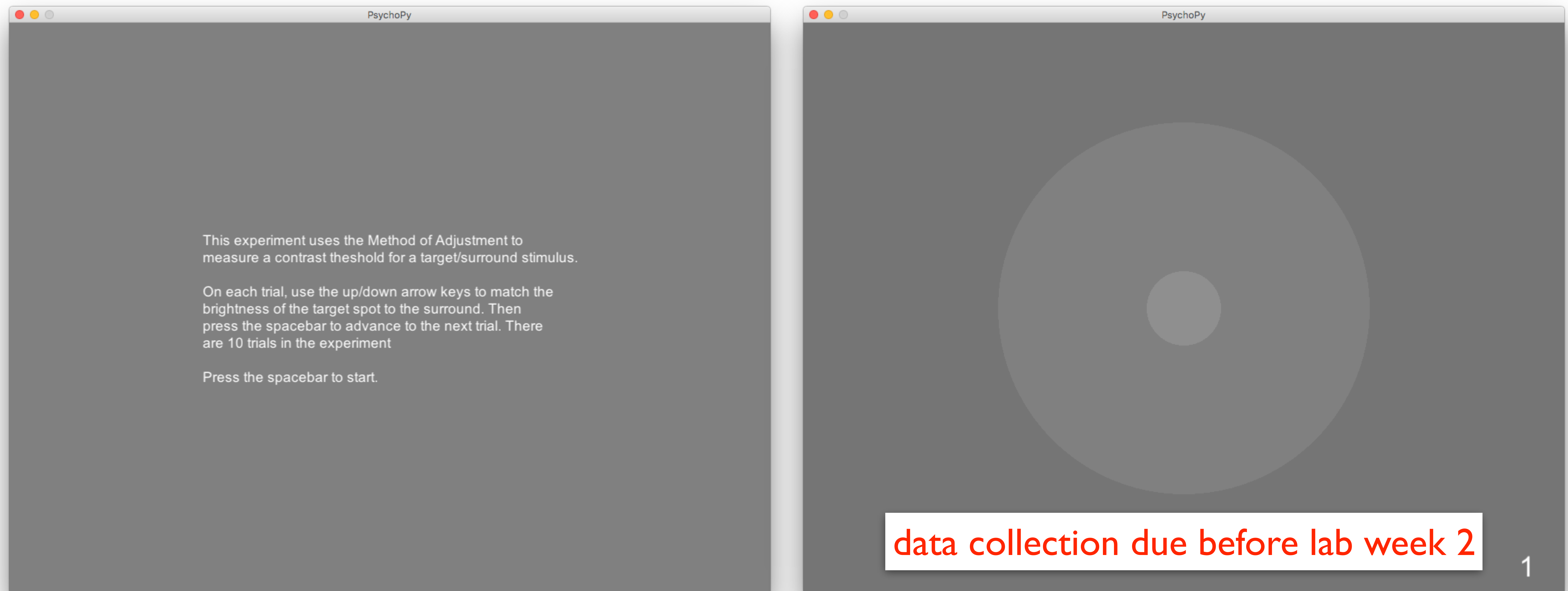


Lab 1 assignment: MOA/MOL experiments



1. Download the **moa_mol.zip** file that contains the the method of adjustment and method of limits experiments from myCourses. Unzip the file to extract the code and resources.
2. Use PsychoPy to run yourself through the method of adjustment experiment (**moa.psyexp**).
 - 2.1. Make sure to use a unique participant id so you can find the resulting .csv file.

Lab 1 assignment: MOA analysis

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	bg_lvl	tst_lvl	direction	sur_lvl	trials.thisRep	trials.thisTria	trials.thisN	trials.thisInd	resp.keys	resp.rt	session	participant	frameRate	expName	date	match			
2	-0.08	0.12	d	0	0	0	0	0	space	42.029165	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.005			
3	-0.08	-0.12	a	0	0	1	1	1	space	15.7192841	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.01			
4	-0.08	0.12	d	0	1	0	2	0	space	10.7762041	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.005			
5	-0.08	-0.12	a	0	1	1	3	1	space	13.0820551	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	4.3368E-17			
6	-0.08	0.12	d	0	2	0	4	0	space	10.9779129	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.005			
7	-0.08	-0.12	a	0	2	1	5	1	space	12.043766	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.005			
8	-0.08	0.12	d	0	3	0	6	0	space	14.3171759	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.005			
9	-0.08	-0.12	a	0	3	1	7	1	space	11.6604788	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	4.3368E-17			
10	-0.08	0.12	d	0	4	0	8	0	space	13.483804	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	-4.337E-17			
11	-0.08	-0.12	a	0	4	1	9	1	space	11.5928149	1	jaf2	59.8480079	moa_v3	2017_Sep_2'	0.005			
12																			
13																			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	direction	sur_lvl	match														
2	d	0	0.005														
3	a	0	0.01														
4	d	0	0.005														
5	a	0	4.3368E-17														
6	d	0	0.005														
7	a	0	0.005														
8	d	0	0.005														
9	a	0	4.3368E-17														
10	d	0	-4.337E-17														
11	a	0	0.005														
12																	
13																	

3. Open the .csv file from the experiment, save the file in .xlsx format.
4. Copy the highlighted columns to a new spreadsheet page

Lab 1 assignment: MOA analysis

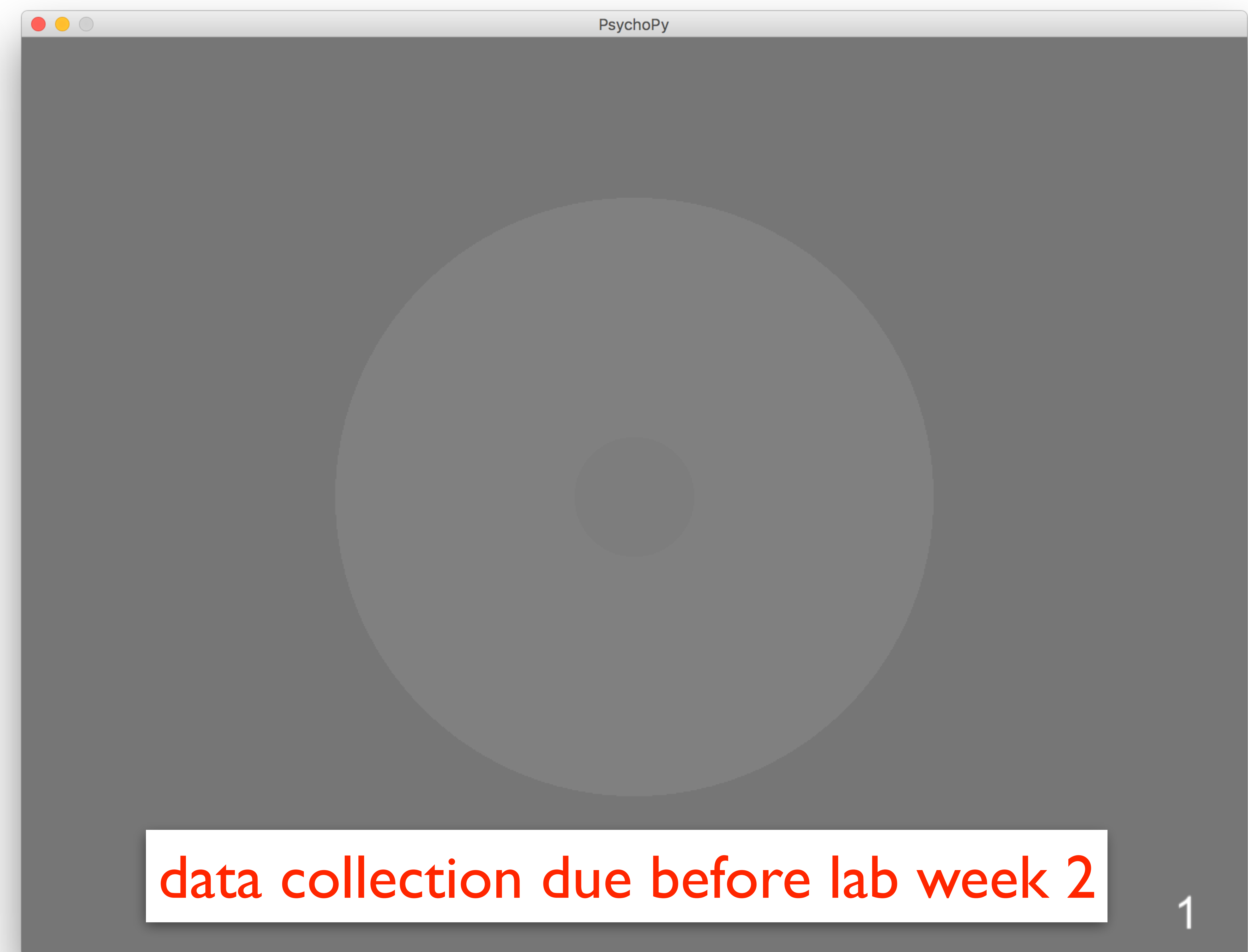
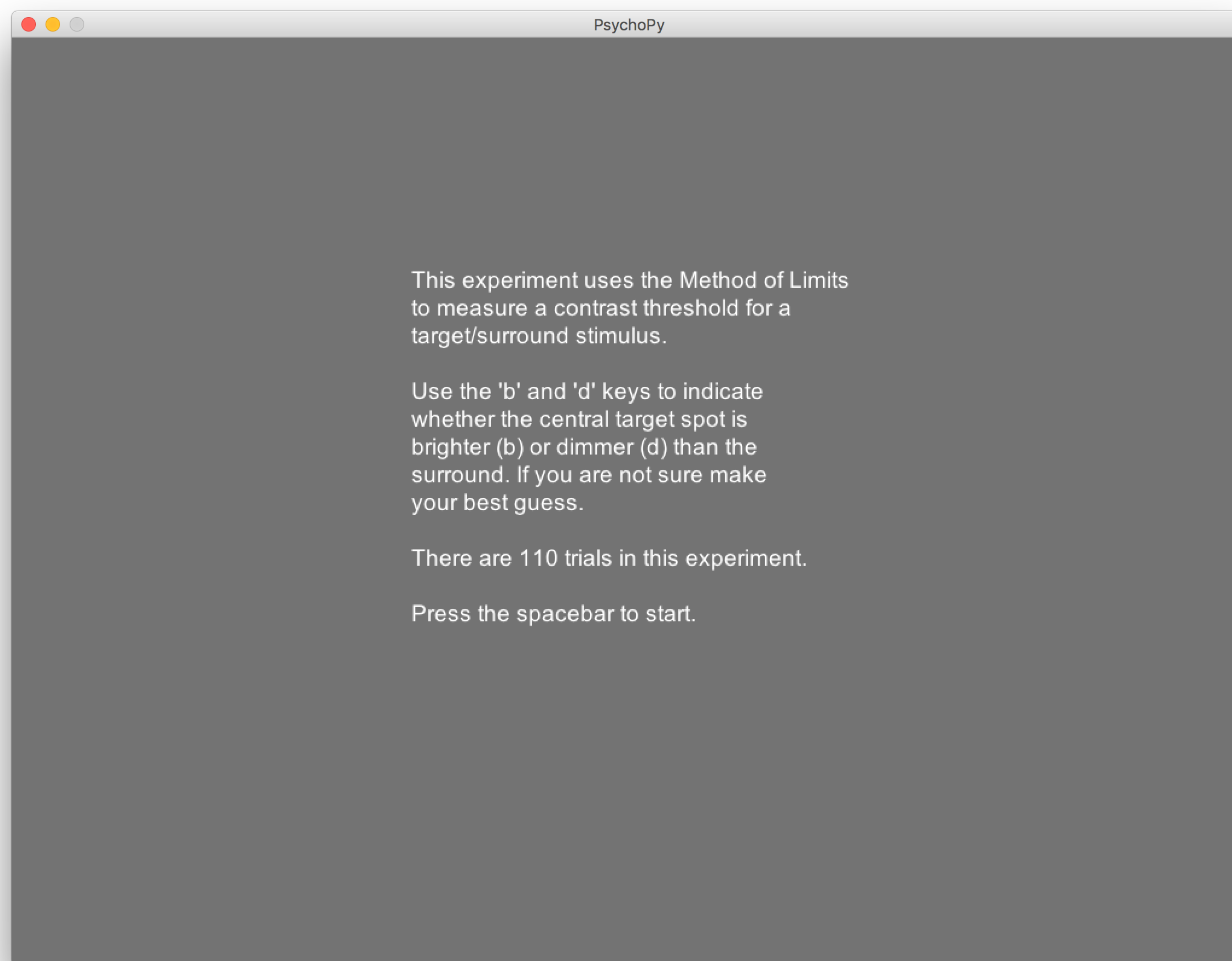
5. Use the Data>Sort menu command to sort all the data by the “direction” column.
6. Calculate separate means and standard deviations for the “match” values in the ascending and descending (a/d) trial sets.
7. Use the Excel TTEST function (two-tailed, unequal variance) to determine if the means for the match values in the a/d sets are significantly different ($p > 0.05$).
8. If the a/d means are not significantly different, calculate the “grand” mean and standard deviation of all the match values.
9. Use this mean and standard deviation to calculate the PSE, JND, UL, LL and IU.

The screenshot shows an Excel spreadsheet with the following data and calculations:

	A	B	C	D	E	F	G	H
1	direction	tgt_lvl	corrAns	resp.keys	resp.corr			
2	a	0	d	d	1			
3	a	0.004	b	d	0			
4	a	0	d	d	1			
5	a	0.004	b	b	1			
6	a	-0.004	d	d	1			
7	a	0	d	b	0			
8	a	0	d	d	1			
9	a	0.004	b	b	1			
10	a	0	d	d	1			
11	a	0.004	b	b	1			
12	d	0	b	b	1			
13	d	-0.004	d	d	1			
14	d	0.012	b	b	1			
15	d	0.008	b	d	0			
16	d	0	b	b	1			
17	d	-0.004	d	d	1			
18	d	0.004	b	b	1			
19	d	0	b	d	0			
20	d	0	b	b	1			
21	d	-0.004	d	b	0			
22								
23	direction	mean	stdev					
24	a	0.0012	0.0027					
25	d	0.0012	0.0053					
26								
27				t-test	1 (a/d means not sig. diff.)			
28								
29		grand mean	stdev					
30		0.0012	0.0041					
31								
32				point of subjective equality (PSE) = grand mean =	0.0012			
33				just noticeable difference (JND) = 0.67 * stdev =	0.0028			
34				upper threshold (UL) = PSE + JND =	0.0040			
35				lower threshold (LL) = PSE - JND =	-0.0016			
36				interval of uncertainty = UL - LL =	0.0055			
37								
38								
39								

The spreadsheet also shows a status bar at the bottom with the text "Normal View" and "Ready".

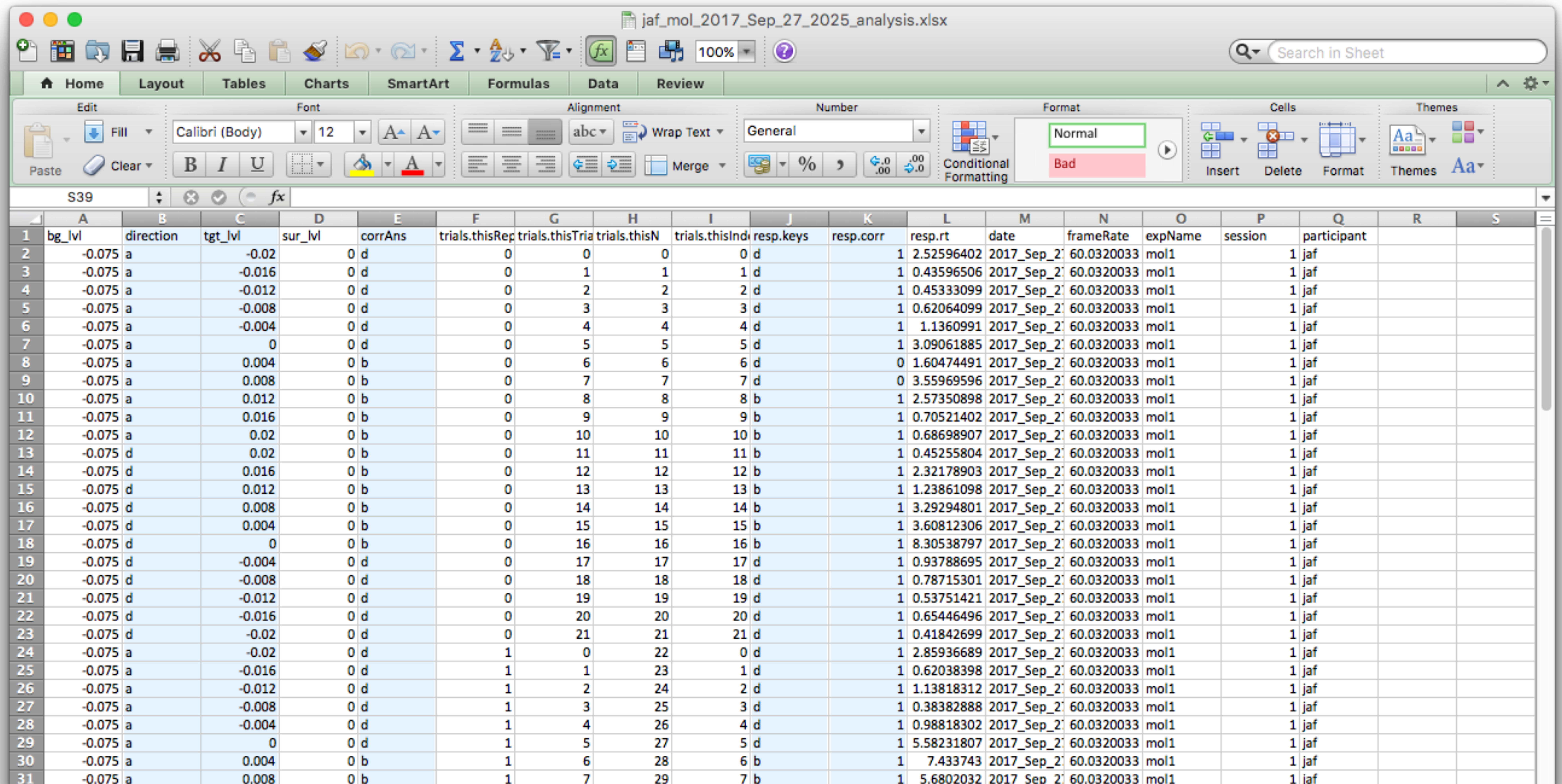
Lab 1 assignment: MOL experiment



10. Use PsychoPy to run yourself through the method of limits experiment (**mol.psyexp**).

10.1. Make sure to use a unique participant id so you can find the resulting .csv file.

Lab 1 assignment: MOL analysis



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	bg_lvl	direction	tgt_lvl	sur_lvl	corrAns	trials.thisRep	trials.thisTri	trials.thisN	trials.thisInd	resp.keys	resp.corr	resp.rt	date	frameRate	expName	session	participant		
2	-0.075	a	-0.02	0	d	0	0	0	0	d	1	2.52596402	2017_Sep_2	60.0320033	mol1	1	jaf		
3	-0.075	a	-0.016	0	d	0	1	1	1	d	1	0.43596506	2017_Sep_2	60.0320033	mol1	1	jaf		
4	-0.075	a	-0.012	0	d	0	2	2	2	d	1	0.45333099	2017_Sep_2	60.0320033	mol1	1	jaf		
5	-0.075	a	-0.008	0	d	0	3	3	3	d	1	0.62064099	2017_Sep_2	60.0320033	mol1	1	jaf		
6	-0.075	a	-0.004	0	d	0	4	4	4	d	1	1.1360991	2017_Sep_2	60.0320033	mol1	1	jaf		
7	-0.075	a	0	0	d	0	5	5	5	d	1	3.09061885	2017_Sep_2	60.0320033	mol1	1	jaf		
8	-0.075	a	0.004	0	b	0	6	6	6	d	0	1.60474491	2017_Sep_2	60.0320033	mol1	1	jaf		
9	-0.075	a	0.008	0	b	0	7	7	7	d	0	3.55969596	2017_Sep_2	60.0320033	mol1	1	jaf		
10	-0.075	a	0.012	0	b	0	8	8	8	b	1	2.57350898	2017_Sep_2	60.0320033	mol1	1	jaf		
11	-0.075	a	0.016	0	b	0	9	9	9	b	1	0.70521402	2017_Sep_2	60.0320033	mol1	1	jaf		
12	-0.075	a	0.02	0	b	0	10	10	10	b	1	0.68698907	2017_Sep_2	60.0320033	mol1	1	jaf		
13	-0.075	d	0.02	0	b	0	11	11	11	b	1	0.45255804	2017_Sep_2	60.0320033	mol1	1	jaf		
14	-0.075	d	0.016	0	b	0	12	12	12	b	1	2.32178903	2017_Sep_2	60.0320033	mol1	1	jaf		
15	-0.075	d	0.012	0	b	0	13	13	13	b	1	1.23861098	2017_Sep_2	60.0320033	mol1	1	jaf		
16	-0.075	d	0.008	0	b	0	14	14	14	b	1	3.29294801	2017_Sep_2	60.0320033	mol1	1	jaf		
17	-0.075	d	0.004	0	b	0	15	15	15	b	1	3.60812306	2017_Sep_2	60.0320033	mol1	1	jaf		
18	-0.075	d	0	0	b	0	16	16	16	b	1	8.30538797	2017_Sep_2	60.0320033	mol1	1	jaf		
19	-0.075	d	-0.004	0	d	0	17	17	17	d	1	0.93788695	2017_Sep_2	60.0320033	mol1	1	jaf		
20	-0.075	d	-0.008	0	d	0	18	18	18	d	1	0.78715301	2017_Sep_2	60.0320033	mol1	1	jaf		
21	-0.075	d	-0.012	0	d	0	19	19	19	d	1	0.53751421	2017_Sep_2	60.0320033	mol1	1	jaf		
22	-0.075	d	-0.016	0	d	0	20	20	20	d	1	0.65446496	2017_Sep_2	60.0320033	mol1	1	jaf		
23	-0.075	d	-0.02	0	d	0	21	21	21	d	1	0.41842699	2017_Sep_2	60.0320033	mol1	1	jaf		
24	-0.075	a	-0.02	0	d	1	0	22	0	d	1	2.85936689	2017_Sep_2	60.0320033	mol1	1	jaf		
25	-0.075	a	-0.016	0	d	1	1	23	1	d	1	0.62038398	2017_Sep_2	60.0320033	mol1	1	jaf		
26	-0.075	a	-0.012	0	d	1	2	24	2	d	1	1.13818312	2017_Sep_2	60.0320033	mol1	1	jaf		
27	-0.075	a	-0.008	0	d	1	3	25	3	d	1	0.38382888	2017_Sep_2	60.0320033	mol1	1	jaf		
28	-0.075	a	-0.004	0	d	1	4	26	4	d	1	0.98818302	2017_Sep_2	60.0320033	mol1	1	jaf		
29	-0.075	a	0	0	d	1	5	27	5	d	1	5.58231807	2017_Sep_2	60.0320033	mol1	1	jaf		
30	-0.075	a	0.004	0	b	1	6	28	6	b	1	7.433743	2017_Sep_2	60.0320033	mol1	1	jaf		
31	-0.075	a	0.008	0	b	1	7	29	7	b	1	5.6802032	2017_Sep_2	60.0320033	mol1	1	jaf		

11. Open the .csv file from the experiment, save the file in .xlsx format.

12. Copy the highlighted columns to a new spreadsheet page

Lab 1 assignment: MOL analysis

13. The letters a,d in the “direction” column indicate the alternating ascending/descending trial series. Identify the crossover points in each series. There are two possible cases

- Transition from 1 to 0 in the “resp.corr” column (correct to incorrect response)
- OR
- Transition from 0 to non-0 in the “tgt_lvl” column

There should be one crossover point in each series and 10 crossover points in all.

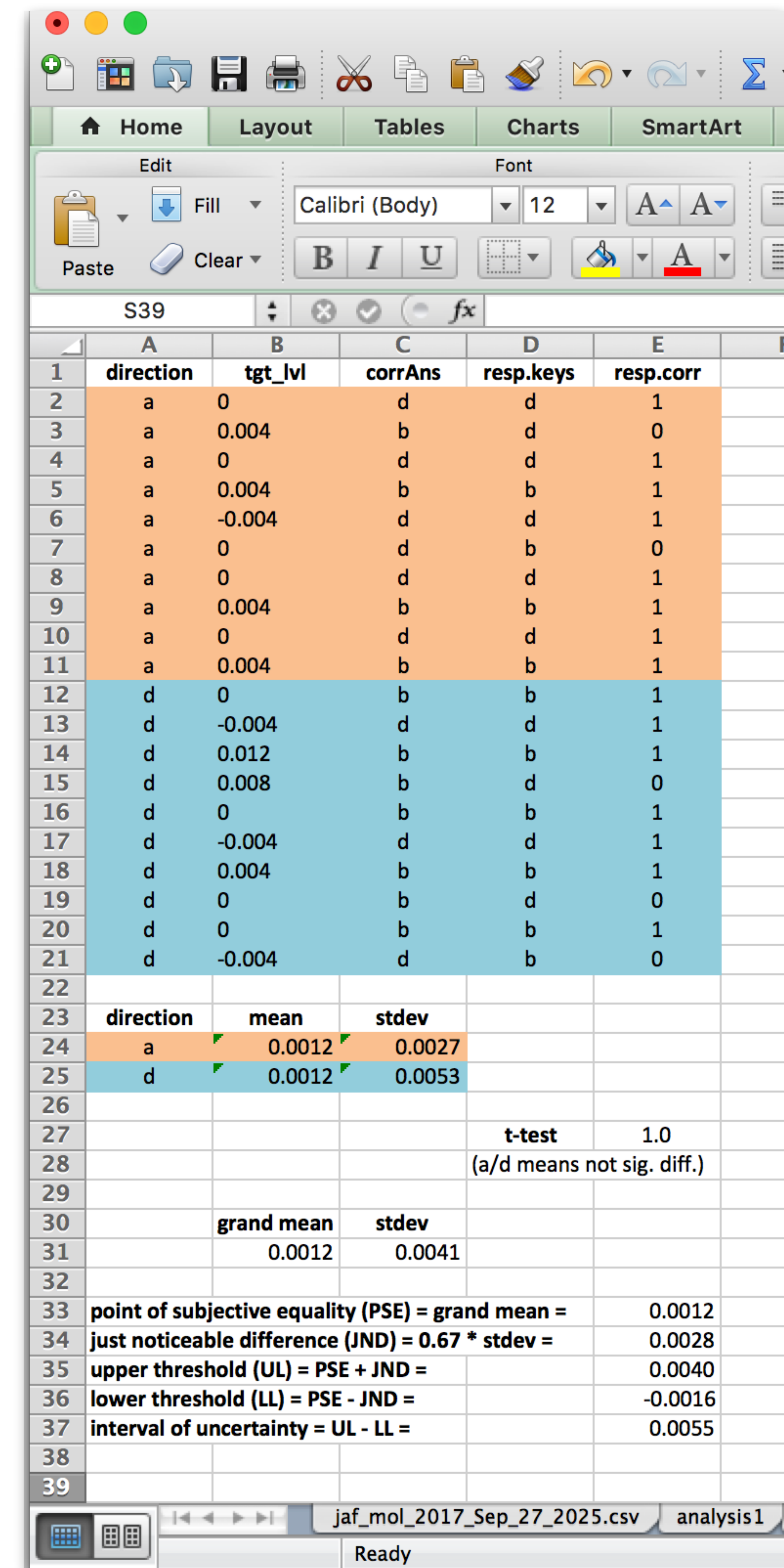
14. Copy the column headers and the rows containing the crossover points to a new spreadsheet page as shown.

	A	B	C	D	E
	direction	tgt_lvl	corrAns	resp.keys	resp.corr
1	a	-0.02	d	d	1
2	a	-0.016	d	d	1
3	a	-0.012	d	d	1
4	a	-0.008	d	d	1
5	a	-0.004	d	d	1
6	a	0	d	d	1
7	a	0.004	b	d	0
8	a	0.008	b	d	0
9	a	0.012	b	b	1
10	a	0.016	b	b	1
11	a	0.02	b	b	1
12	d	0.02	b	b	1
13	d	0.016	b	b	1
14	d	0.012	b	b	1
15	d	0.008	b	b	1
16	d	0.004	b	b	1
17	d	0	b	b	1
18	d	-0.004	d	d	1
19	d	-0.008	d	d	1
20	d	-0.012	d	d	1
21	d	-0.016	d	d	1
22	d	-0.02	d	d	1
23	a	-0.02	d	d	1
24	a	-0.016	d	d	1
25	a	-0.012	d	d	1
26	a	-0.008	d	d	1
27	a	-0.004	d	d	1
28	a	0	d	d	1
29	a	0.004	b	b	1
30	a	0.008	b	b	1
31	a	0.012	b	b	1
32	a	0.016	b	b	1
33	a	0.02	b	b	1
34	d	0.02	b	b	1
35	d	0.016	b	b	1
36	d	0.012	b	b	1
37	d	0.008	b	d	0
38	d	0.004	b	d	0
39	d	0	b	d	0

	A	B	C	D	E
	direction	tgt_lvl	corrAns	resp.keys	resp.corr
1	a	0	d	d	1
2	a	0.004	b	d	0
3	a	0.008	b	d	0
4	d	0	b	b	1
5	d	-0.004	d	d	1
6	a	0	d	d	1
7	a	0.004	b	b	1
8	d	0.012	b	b	1
9	d	0.008	b	d	0
10	a	-0.004	d	d	1
11	a	0	d	b	0
12	d	0	b	b	1
13	d	-0.004	d	d	1
14	a	0	d	d	1
15	a	0.004	b	b	1
16	d	0.004	b	b	1
17	d	0	b	d	0
18	a	0	d	d	1
19	a	0.004	b	b	1
20	d	0	b	b	1
21	d	-0.004	d	b	0
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					

Lab 1 assignment: MOL analysis

15. Group the ascending and descending series crossover points together by using the Data>Sort menu command to sort all the data by the “direction” column.
16. Calculate separate means and standard deviations for the a/d crossover points (“tgt_lvl”s)
17. Use the Excel TTEST function (two-tailed, unequal variance) to determine if the means for the a/d crossover points are significantly different ($p > 0.05$).
18. If the a/d means are not significantly different, calculate the grand mean and standard deviation for all the crossover points
19. Use the grand mean and standard deviation to calculate the PSE, JND, UL, LL and IU.



	A	B	C	D	E
	direction	tgt_lvl	corrAns	resp.keys	resp.corr
1					
2	a	0	d	d	1
3	a	0.004	b	d	0
4	a	0	d	d	1
5	a	0.004	b	b	1
6	a	-0.004	d	d	1
7	a	0	d	b	0
8	a	0	d	d	1
9	a	0.004	b	b	1
10	a	0	d	d	1
11	a	0.004	b	b	1
12	d	0	b	b	1
13	d	-0.004	d	d	1
14	d	0.012	b	b	1
15	d	0.008	b	d	0
16	d	0	b	b	1
17	d	-0.004	d	d	1
18	d	0.004	b	b	1
19	d	0	b	d	0
20	d	0	b	b	1
21	d	-0.004	d	b	0
22					
23	direction	mean	stdev		
24	a	0.0012	0.0027		
25	d	0.0012	0.0053		
26					
27				t-test	1.0
28				(a/d means not sig. diff.)	
29					
30		grand mean	stdev		
31		0.0012	0.0041		
32					
33	point of subjective equality (PSE) = grand mean =				0.0012
34	just noticeable difference (JND) = 0.67 * stdev =				0.0028
35	upper threshold (UL) = PSE + JND =				0.0040
36	lower threshold (LL) = PSE - JND =				-0.0016
37	interval of uncertainty = UL - LL =				0.0055
38					
39					

Lab 1 assignment: report

direction	sur_lvl	match
a	0	0.01
a	0	4.34E-17
a	0	0.005
a	0	4.34E-17
a	0	0.005
d	0	0.005
d	0	0.005
d	0	0.005
d	0	0.005
d	0	-4.34E-17

direction	sur_lvl	mean	stdev
a	0	0.0040	0.0042
d	0	0.0040	0.0022

t-test 0.9468
(a/d means not sig. diff.)

grand mean 0.0040
stdev 0.0032

point of subjective equality (PSE) = grand mean = 0.0040
just noticeable difference (JND) = $0.67 * \text{stdev}$ = 0.0021
upper threshold (UL) = PSE + JND = 0.0061
lower threshold (LL) = PSE - JND = 0.0019
interval of uncertainty = UL - LL = 0.0042

direction	tgt_lvl	corrAns	resp.keys	resp.corr
a	0	d	d	1
a	0.004	b	d	0
a	0	d	d	1
a	0.004	b	b	1
a	-0.004	d	d	1
a	0	d	b	0
a	0	d	d	1
a	0.004	b	b	1
a	0	d	d	1
a	0.004	b	b	1
d	0	b	b	1
d	-0.004	d	d	1
d	0.012	b	b	1
d	0.008	b	d	0
d	0	b	b	1
d	-0.004	d	d	1
d	0.004	b	b	1
d	0	b	d	0
d	0	b	b	1
d	-0.004	d	b	0

direction	mean	stdev
a	0.0012	0.0027
d	0.0012	0.0053

t-test 1.0
(a/d means not sig. diff.)

grand mean 0.0012
stdev 0.0041

point of subjective equality (PSE) = grand mean = 0.0012
just noticeable difference (JND) = $0.67 * \text{stdev}$ = 0.0028
upper threshold (UL) = PSE + JND = 0.0040
lower threshold (LL) = PSE - JND = -0.0016
interval of uncertainty = UL - LL = 0.0055

20. Create a well-formatted 2 page PDF named **yourlastname_lab1.pdf** that documents the your analysis of experiment as shown above. Use the images above as a guide for layout and formatting. Your document does not have to be identical, but it should be mathematically correct, correctly labeled, and legible.

Lab 1 assignment: submission

21. Create a zip file named **yourlastname_lab1.zip** that contains the following

21.1. The original .csv data files from your runs of the two experiments.

21.2. The .xlsx files that contain your analyses of the data from the two experiments.

21.3. The single PDF file that you created in step 22

22. Submit the zip file to the lab1 dropbox by the due date

If for some reason your analysis is not working out, contact me for help and advice on how to proceed. For this reason please do not wait until the last minute to do this assignment.